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UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY  
WASHINGTON, D.C. 20242

Technical Letter  
NASA - 61  
November 1966

Dr. Peter C. Badgley  
Chief, National Resources Program  
Office of Space Science and Applications  
Code SAR, NASA Headquarters  
Washington, D.C. 20546

Dear Peter:

Transmitted herewith are 3 copies of

TECHNICAL LETTER NASA-61  
HYDROLOGIC INTERPRETATION OF  
NIMBUS VIDICON IMAGE -- GREAT SALT LAKE, UTAH\*

by

D. C. Hahl and A. H. Handy\*\*

Sincerely yours,

*W. A. Fischer*

William A. Fischer  
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\*\*U.S. Geological Survey, Water Resources Division, Salt Lake City, Utah.  
\*Work performed under NASA contract R-09-020-015

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TECHNICAL LETTER NASA-61  
HYDROLOGIC INTERPRETATION OF  
NIMBUS VIDICON IMAGE -- GREAT SALT LAKE, UTAH\*

by

D. C. Hahl and A. H. Handy

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Prepared by the Geological Survey for  
National Aeronautics and Space  
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HYDROLOGIC INTERPRETATION OF NIMBUS VIDICON IMAGE  
GREAT SALT LAKE, UTAH

by

D. C. Hahl and A. H. Handy

A Nimbus Advanced Vidicon Camera System (AVCS) image of Great Salt Lake and adjacent areas recorded in September 1964 was examined to determine if features of hydrologic significance were visible and identifiable. An annotated copy of the image is shown in figure 1.

Evidently several factors are required to produce an image. Features such as Willard Bay Reservoir and Utah Lake do not show on the image, yet Great Salt Lake, which is of comparable depth shows clearly. Adjoining Willard Bay Reservoir is Bear River Bay Migratory Bird Refuge, which is discernible. The dikes, land areas, and water areas in the refuge match those on recent aerial photographs. Depth does not seem to be a factor in producing an image because the brackish water of the refuge that is less than two feet deep shows black; whereas, subaqueous features ("X's" offshore of Great Salt Lake, figure 1) of comparable depth in Great Salt Lake show through the brine.

Vegetation and geology may be responsible for the delineation or lack of delineation of some features. An example is a comparison between White Valley and Floating Island. White Valley is surrounded by mountains of about equal height (4,500 feet above the valley floor), yet only the eastern mountains are visible. Floating Island is a small feature (800 feet above the desert floor) and it shows clearly in the image.

The only man-made features discernible are the Bear River Bay Migratory Bird Refuge and the open pit copper mine of Kennecott Copper Corporation at Bingham.

Hydrologic interpretations of the image must be based on the indirect evidence of geographic and geologic features seen in the image. The most recognizable feature is Great Salt Lake. Possibly additional Nimbus pictures may aid in determining the change in shape and size of the lake with change in stage even though there is some penetration of the water. Correlation of the edge of the lake as shown in the image with depth is not possible because of the coarse resolution of the image. Seasonal changes in the size and shape of desert areas may be shown by additional pictures if the shading is due to vegetation.

The AVCS image is of interest to hydrologists. Though the cause of changes in shading on the image will be recorded only by ground monitoring, remote-sensing techniques present a means of recording occurrences heretofore not visualized. In an area such as Utah where diverse geography, geology, and hydrology exist, a key to photographic tones can possibly be established that will be applicable in interpreting data from unstudied areas. The synoptic view would be helpful in planning better coordinated ground work.

# NIMBUS SATELLITE AVCS IMAGERY GREAT SALT LAKE, UTAH

